

## TWO NEW SPECIES OF HEMICYCLIOPHORA (NEMATODA; TYLENCHIDA).

By M. R. SAUER, Commonwealth Research Station, Merbein.

(Communicated by Mr. A. J. Bearup.)

(Two Text-figures.)

[Read 30th July, 1958.]

---

Synopsis.

Two new species of *Hemicycliophora* (*H. tessellata* and *H. brevicauda*) are described which differ from known species of the genus in that the females have less than 200 body annules.

---

## INTRODUCTION.

The number of body annules in the female has long been accepted as an important character in the separation of certain genera of the Criconematinae. Taylor (1936) separated *Criconemoides* and *Procriconema* in part on this character: *Criconemoides* with 160 or less annules, *Procriconema* with 200 or more annules. More recently, Loos (1948) synonymized *Procriconema* and *Hemicycliophora*. The concept that females of *Hemicycliophora* have 200 or more body annules has been sustained by Tarjan (1952) in a review of the genus, and by Thorne (1955) in a paper describing 15 new species, and including a valuable key to the known species. Lately, Colbran (1956) has published the description of an Australian species, *H. truncata*, which appears to have about 200 annules.

Chitwood and Birchfield (1957), in erecting a new genus, *Hemicriconemoides*, within the subfamily Criconematinae, expressed opposition (in a footnote) to the idea of setting apart *Hemicycliophora* as having 200 or more annules. The nematodes now described appear to support the stand taken by Chitwood and Birchfield, in that these nematodes appear clearly to belong to the genus *Hemicycliophora*, yet both have between 140 and 160 body annules. In these two species the females have a sheath with simply marked cuticle; the males have no sheath and no stylet, the spicules are hooked, and caudal alae are prominent.

Acceptance of forms with about 150 annules as belonging to *Hemicycliophora* increases the difficulty of distinguishing between females of *Hemicycliophora* and *Hemicriconemoides*; however, Chitwood and Birchfield suggest that the presence of a dorsal intestinal extension anterior to the base of the oesophagus may be a good generic character for *Hemicriconemoides*. The two species described in this paper do not show such an extension.

## HEMICYCLIOPHORA TESSELLATA, n. sp. (Fig. 1).

*Measurements* (on sheath): 5 ♀♀.—L = 0.850 to 0.950 mm.; *a* = 18–22; *b* = 5.3–5.9; *c* = 13–18; V = 90–92%. 3 ♂♂.—L = 0.690 to 0.735 mm.; *a* = 27.5–29; *b* = 5.9–6.8; *c* = 9.1–9.5.

*Female*: Body stout, cylindrical, arcuate when relaxed by heating. Larval cuticle attached fairly closely to body except at tail. Annules about 150, very coarse, the annules of the sheath rather flattened, those of the body cuticle more or less rounded. Tail bluntly rounded, terminus hemispheroid. At the terminus the body cuticle carries a hemispherical appendage whose structure could not be ascertained. This appendage is readily stained in cotton blue lactophenol and therefore does not appear to be of cuticular origin. The head in most specimens, but not all, is retracted in the sheath which forms a protruding collar around it.

The cuticular annulations are marked by 20 rather deep and wide longitudinal grooves, so that the surface appears as rows of rectangular blocks. A diagrammatic

representation is given in Text-figure I, F, but the full number of grooves can be determined only in transverse section, and only a few rows of cuticle blocks are visible under high power of the microscope. No evidence of a lateral field was seen.

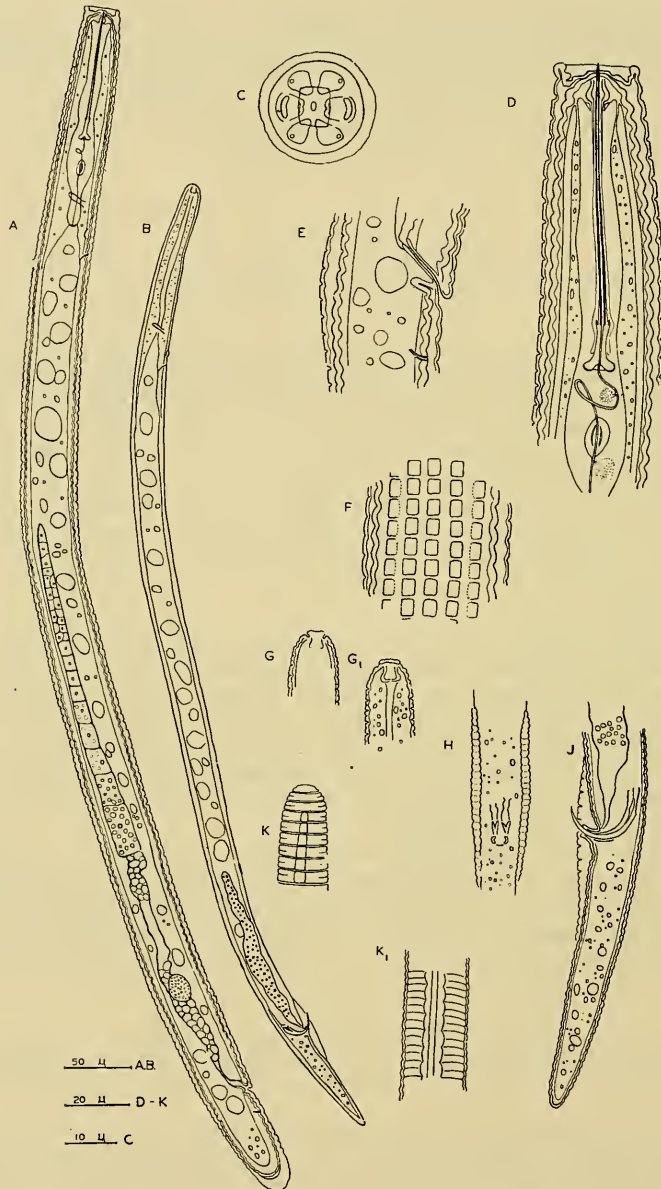


Fig. 1.—*Hemicycliophora tessellata*, n. sp.

A, female; B, male; C, face view, female; D, anterior end, female; E, region of vulva; F, surface structure, female; G, G<sub>1</sub>, head end male, ventral and lateral views; H, caudal alae, ventral view; J, male tail; K, K<sub>1</sub>, lateral fields, male.

The head, surmounted by a large rectangular labial disc, appears to consist of two annules, not set off from the body. It has a stout framework. In face view the head framework is hexaradiate, and the amphids (?) appear near the edge of the labial disc as barely visible slits. Spear rather stout, 95 to 105 microns, comprising a

long shaft and thick basal portion about 15 microns long. Spear knobs large, without forward pointing processes. Dorsal gland opening about 12 microns behind the base of the spear. Median oesophageal bulb about half body width, with large valve; posterior bulb about one-third body width. The excretory pore is situated about 20 microns behind the junction of oesophagus and intestine. Hemizonid large.

Ovary single, outstretched, varying from 42% to 52% of total body length in specimens observed. Vagina rather long, strongly cuticularized. Ventral contraction of body at vulva. Oviduct long with prominent ovoid spermatheca containing spermatozoa. Posterior end of intestine and rectum not seen. Anus visible only in ventral view, opening some four body annules posterior to the vulva.

*Male*: No sheath. Body slender, arcuate when relaxed by heating, finely annulated. In the head region and on the caudal alae the cuticle shows a paired annule formation, every second annule being set off by a deeper constriction. Lateral fields marked by four incisions, the inner lines more or less straight, the outer lines crenate at intervals equal to two body annules.

Framework of head much reduced, no spear. Oesophagus reduced, no bulbs or valve. The excretory pore opens opposite the anterior end of the oesophagus and a prominent hemizonid is visible a few body annules anterior to it. Intestine vacuolate. Testis quite short, 13% to 17% of total body length in specimens studied. Spicules paired, long and strongly curved. Marked protrusion of the body cuticle at the cloaca. Gubernaculum short, simple. Caudal alae thick, prominent. Tail long, conical to a fairly blunt terminus.

*Types*.—Holotype: Female, slide *Hemicycliophora* 1, Commonwealth Research Station, Merbein. Collected 14th August, 1957. Allotype: Male, slide *Hemicycliophora* 1, data as above. Paratypes: Five females, two males.

*Type locality*: Soil beneath *Eucalyptus incrassata* Labill., beside the Calder Highway, one mile south of Hattah, Victoria.

#### HEMICYCLIOPHORA BREVICAUDA, n. sp. (Fig. 2).

*Measurements* (on sheath): 12 ♀♀.— $L = 0.710$  to  $0.785$  mm.;  $a = 18-20$ ;  $b = 4.6-5.6$ ;  $c = -$ ;  $V = 96-97\%$ . 7 ♂♂.— $L = 0.500$  to  $0.590$  mm.;  $a = 25-30$ ;  $b = 5.8-7.2$ ;  $c = 12-14$ .

*Female*: Body stout, cylindrical, marked by about 150 simple, coarse annules. Annules of sheath somewhat flattened. Sheath fitting body fairly closely, sometimes loose at terminus. Tail hemispherical. Lateral field indicated by a more or less distinct, faint longitudinal groove which tends to be most prominent in the mid-region of the body. All specimens show some irregularity of the annules—usually one annule in the mid-region divides to two along the lateral groove. Some specimens show two or three such irregularities, always widely separated. Other lateral lines are often indicated by faint markings or irregularities in the annules; possibly there may be four lines altogether but no more than three have been seen in specimens examined. The specimen illustrated (Text-fig. 2, H) has one very prominent incisure and indications of a second line. The divided annule is typical.

The head consists of two annules, not set off, surmounted by a large, nearly square labial disc. Face view similar to *H. tessellata* but the head framework inclined to be more slender. Two slits may represent the amphids. The spear is long, 85 to 92.5 microns, with the robust basal portion about 15 microns long. Dorsal oesophageal gland opening about 10 microns behind the spear base. Excretory pore about 20 microns posterior to the oesophago-intestinal junction. Hemizonid large.

Ovary single, outstretched, 42% to 55% of total body length in these specimens. Vagina strongly cuticularized. Ventral contraction of body at vulva. Long oviduct including a distinct, nearly round spermatheca well filled with spermatozoa. Intestine ending near vagina, rectum reasonably short but seldom visible. Anus seldom visible in lateral view. Anus opens about two body annules behind the vulva.

*Male*: No sheath. Body slender, finely annulated. Lateral fields marked by four nearly smooth lines, about one-third body width.

Head framework reduced. No spear, oesophageal bulbs, or valve present. Hemizonid prominent a few annules anterior to the excretory pore, which opens just behind



the anterior and end of the intestine. Intestine vacuolate. Testis short, 16% to 21% of total body length in specimens measured. Spicules long, strongly curved. Marked protrusion of cuticle around the spicules. Gubernaculum short, simple. Definite constriction of the body at the posterior end of the prominent caudal alae. Tail rather short, with acute terminus.



Fig. 2.—*Hemicycliophora brevicauda*. n. sp.

A, face view, female; B, female; C, male; D, anterior end, female; E, male tail; F, female tail; G, G<sub>1</sub>, male head lateral and ventral aspects; H, lateral field, female.

*Types*.—Holotype: Female, slide *Hemicycliophora* 2, Commonwealth Research Station, Merbein. Collected 14th August, 1957. Allotype: Male, slide *Hemicycliophora* 2, data as above. Paratypes: 45 females, 6 males.

*Type locality*: Soil beneath *Codonocarpus cotinifolius* F. v. M., on the track to Lake Mournpoul, Hattah, Victoria.

#### DIAGNOSIS.

*Hemicycliophora tessellata* and *H. brevicauda* are readily distinguished from species of *Hemicycliophora* previously described by the low number of body annules in the female, about 150 for each species. In other respects they resemble most closely

*H. obtusa* Thorne, 1955, in showing a hemispheroid terminus and a ventral contraction at the vulva. Males are not known in most species of the genus (including *H. obtusa*).

*Hemicyclophora tessellata* is distinguished as follows: Bisexual species. Female with sheath, about 140–160 annules, hemispheroid tail, ventral contraction at the vulva, body annules divided by 20 longitudinal grooves, sheath usually protruding around head. Male without sheath, spicules much curved, caudal alae prominent, moderately long conical tail, blunt terminus.

*Hemicyclophora brevicauda* is distinguished as follows: Bisexual species. Female with sheath, about 140–160 plain annules, very short hemispherical tail, vulva near terminus, ventral contraction at vulva. Male without sheath, spicules much curved, short pointed tail constricted at the end of the prominent caudal alae.

#### Acknowledgements.

Mr. L. Smith, of Commonwealth Research Station, Merbein, washed the soil samples for the author. These samples were processed in a modified Seinhorst extraction apparatus (Seinhorst, 1956).

#### References.

- CHITWOOD, B. G., and BIRCHFIELD, W., 1957.—A new genus, *Hemicriconemoides* (Criconematidae: Tylenchina). *Proc. helm. Soc. Wash.*, 24: 80-86.
- COLBRAN, R. C., 1956.—Studies of plant and soil nematodes. I. Two new species from Queensland. *Qd. Jour. agric. Sci.*, 13: 123-126.
- LOOS, C. A., 1948.—Notes on freeliving and plant parasitic nematodes of Ceylon. 3. *Ceylon Jour. Sci. (B)*, 23: 119-124.
- SEINHORST, J. W., 1956.—The quantitative extraction of nematodes from soil. *Nematologica*, 1: 249-267.
- TARJAN, A. C., 1952.—The nematode genus *Hemicyclophora* de Man, 1921 (Criconematidae) with a description of a new plant parasitic species. *Proc. helm. Soc. Wash.*, 19: 65-77.
- TAYLOR, A. L., 1936.—Genera and species of the Criconematinae, a subfamily of the Anguillulidae (Nematoda). *Trans. Amer. micr. Soc.*, 50: 391-421.
- THORNE, G., 1955.—Fifteen new species of the genus *Hemicyclophora* with an amended description of *H. typica* de Man (Tylenchida: Criconematidae). *Proc. helm. Soc. Wash.*, 22: 1-16.
-